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AUTHOR Drew, Po Yin; Watkins, David
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ABSTRACT

This study investigates the interrelationships of academic causal attributions, academic self-concept, learning approaches, and their effects on academic achievement among Hong Kong Chinese tertiary students. It was hypothesized that academic causal attributions and academic self-concept affect the learning approaches students adopt and subsequently influence achievement outcomes. Structural equation modeling was used to clarify the interrelationships of these variables and their relative contributions to academic achievement. The participants were 162 first-year full-time Hong Kong Chinese university students. Results show that, as predicted, both academic causal attributions and academic self-concept have direct effects on students' learning approaches that in turn influenced their academic achievement. (Contains 2 figures, 4 tables, and 90 references.) (Author/SLD)

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Po Yin Drew

Hong Kong Institute of Education

David Watkins

University of Hong Kong

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Affective Variables, Learning Approaches and Academic Achievement: A Causal Modeling Investigation with Hong Kong Chinese Tertiary Students

Abstract

This study investigates the interrelationships of academic causal attributions, academic self-concept, learning approaches and their effect on academic achievement among Hong Kong Chinese tertiary students. It was hypothesized that academic causal attributions and academic self-concept affect the learning approaches the students adopted and subsequently influenced achievement outcomes. Structural equation modeling was used to clarify the interrelationships of these variables and their relative contributions to academic achievement. The participants were 162 first year full-time Hong Kong Chinese university students . The results showed that as predicted both academic causal attributions and academic self-concept had direct effects on students' learning approaches which in turn influenced their academic achievement.

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Correspondence: Po Yin Drew, Deparment of Educational Studies, The Hong Kong Institute of Education, Grantham Campus IIA, 42 Gascoigne Road, Kowloon, Hong Kong.

E-mail: pydrew@gc.ied.edu.hk

Academic achievement has been the focus of numerous research studies over the last few decades. Much research have tried to identify factors that affect or predict academic achievement (Horn et al. 1993) and many findings have shown that individual student characteristic variables are important factors influencing academic achievement in tertiary education (Minnaert & Janssen, 1992; Power, Robertson & Baker, 1987; Watkins, 1986). While many of these variables are believed to have influence over achievement, little is known about their inter-relationships. So far few studies have examined the complexities of these variables simultaneously and their causal effects on each other (Keeves, 1986; Kurtz-Costes, 1994; Marsh, 1990, Murray-Harvey, 1994, Watkins, 1989). The purpose of this study is to investigate the inter-relationships of academic causal attributions, academic self-concept, learning approaches and their influence on academic achievement among Hong Kong Chinese tertiary students. It is hypothesized that academic causal attributions, academic self-concept, both being personality characteristic factors, have direct influence on learning approaches which in turn influence academic achievement. A path model was developed to explain the inter-relationships of the variables and the model was tested by using structural equation modeling procedures.

Academic Causal Attributions

Causal attributions refer to the investigation and judgement of why an event occurs. Attribution theory first introduced by Heider in 1958 was used to explain people's causal attributions of their social events. Weiner (1979, 1986) proposed an attributional theory of motivation which has since started numerous research studies on attribution within the context of academic settings. Individual students differ in their explanation of the causes of academic success and failure. This attributional process has significant influence on students' cognitive, affective and achievement-related behaviours (Weiner, 1986).

Weiner (1979) assumed that ability, effort, task difficulty and luck were the four most salient causes of academic outcomes. Other studies have also found that causes such as interest, mood, help from others and parental support can also be important perceived causes of achievement (Elig & Frieze, 1975). These perceived causes can be classified along three dimensions, viz. locus of causality, stability, and controllability (Weiner, 1986). Ability and effort are commonly classified by researchers as internal attributions while task difficulty and luck are seen as external attributions.

While many research studies have found that causal attributions are associated with academic performance (Findley & Cooper, 1983), the direction of their relationship is controversial. Whether it is an internal attribution that brings about better achievement outcomes or successful outcomes are attributed to internal causes is still debatable. Marsh (1984) maintained that achievement was causally dominant over attributions whereas Covington and Omelich (1984) argued for the reverse.

It has been pointed out that a student's locus of control orientation reflects his attitude and responsibility allocation on learning. For example, the internal locus of control signifies that the student accepts personal responsibility for his performance, while the external locus of control reflects a belief that a student has little personal control over his learning (Sinclaire, 1991). This internalizing and acceptance of responsibility is associated with achievement results.

On the other hand, studies into the relationship between locus of causality and academic success at college level have yielded inconsistent results (see Bowen, 1977). Chen and Tollefson (1989) investigated college students' attributions for general academic performance and for their achievement in a specific course reported that internal locus of control is a characteristic of high achievers. Watkins (1989) reported that perceived personal control or acceptance of personal responsibility for learning is found to be associated with higher academic performance among Filipino students. In another study of Australian college students, however, Watkins (1987) found that there

was little relationship between locus of control and first year college academic success. It was found, however, that internality is related to a less superficial learning approach. This finding, nevertheless, was in line with the view that internal locus of control is related to the deep level learning which is more likely to lead to higher quality of learning outcomes (Ramanaaiah, Ribich and Schmeck, 1975 Watkins, 1984; Watkins and Astilla, 1984).

Perry and Penner (1990) also found that poor academic performance is associated with a low perceived control. Students with internal control orientation benefit more from quality instruction than their external peers. It was pointed out that attributional retraining on external-locus, at risk students, to become more internal-locus would lead to improvement in academic performance provided that instruction is effective (Perry & Hechter,1993). It is therefore not unreasonable to postulate that perhaps the influence of locus of control on academic achievement is not direct but some mediating variables such as the quality of instruction, learning approaches or study skills are in play.

Self-Concept

Self-concept is a psychological construct which refers to the cluster of ideas and attitudes an individual holds about himself. It involves all the ways he uses to describe himself, and his evaluation of himself (self-esteem). With respect to its conceptualization, many recent research studies (e.g. Hattie, 1992; Marsh, 1987) have come to support the hierarchical and multifaceted model developed by Shavelson, Hubner, and Stanton (1976). According to Shavelson et al (1976) the self-concept hierarchy is divided into academic and non-academic components.

Research studies have shown that academic self-concept is significantly related to achievement. In a meta-analysis carried out by Hansford and Hattie in 1982, it was found that the average correlation between general self-concept and achievement was

0.21 and that between academic self-concept and achievement was 0.42. While it is generally agreed that academic self-concept is closely related to academic achievement, their causal ordering is also disputable. The self-enhancement theory suggested that self-concept determines achievement (Chapman et al, 1981; Marsh, 1987; Shavelson & Bolus, 1982; Song & Hattie, 1984). It could be argued that students who view themselves as capable of academic success presumably work harder and therefore perform better than their peers. Also a favourable self-concept may be an important precondition for coping with difficult learning situations, which in turn will facilitate academic success. On the other hand, in support of the skill development theory, some research studies maintained that academic achievement is causally dominant over self-concept (Byrne & Carlson, 1982; Byrne, 1986; Newman, 1984). This line of thought suggested that self-concept is influenced by achievement levels, so it is a consequence of achievement rather than a cause. Another alternative view on the relationship between self-concept and achievement is that they have a reciprocal relationship (Marsh, 1984; Skaalvik & Hagtvet, 1990). Marsh (1984) suggested that academic achievement and self-concept are interwoven in a network of reciprocal relationship that changes in one variable produces changes in the other variable. Skaalvik and Hagtvet (1990) proposed the model that the causal predominance of achievement over self-concept diminishes over time to become reciprocal.

Kurtz-Costes and Schneider (1994) using structural equation modeling in exploring the causal relationship between self-concept and achievement reported a bi-directional relationship. It was pointed out that students' achievement influences their views of themselves as learners; academic self-concept, in turn, serves as a motivating factor that shapes future achievement. Their findings did not support neither the self-enhancement theory nor the skill development theory as both theories were considered inadequate in explaining the complexities of the underlining processes. On the other hand, Helmke and Aken (1995) also using structural equation modeling methods to examine the causal ordering of achievement and self-concept of ability argued that self-concept did not predict achievement.

Learning Approaches

Individual students have preferred ways of tackling their learning tasks thus different approaches to studying are found among learners. Marton (1976) identified two distinct approaches to studying, viz. the deep approach and the surface approach. The deep approach refers to a deeper level of understanding whereby the learner understands the content, the argument and the meaning of the learning materials and is able to apply a more critical point of view and can justify and interact with the learning materials. The surface approach involves a superficial mastery of the learning materials where the learner typically memorizes the facts. Entwistle et al (1979) also confirmed the deep and surface approaches and elaborated this by arguing that there are the deep active, deep passive, surface active and surface passive approaches. Biggs (1979) further proposed the deep, surface and achieving approaches to studying. Each of the three approaches consists of the motive and strategy components. There is a strong relationship between the respective motives and strategies as in undertaking any learning activity, the learner tends to be influenced by a corresponding motive.

Many research studies have considered the impact of learning approaches on learning outcomes. Biggs (1987a), Entwistle and Entwistle (1991), and Trigwell and Prosser (1991) have confirmed that the approaches students adopt have subsequent effect on the quality of their learning. The surface approach generally brings about a superficial grasp of the subject content and a low level of conceptual understanding whereas the deep approach evokes understanding and integrating of principles and concepts (Murray-Harvey, 1994). The deep approach to studying is considered superior to the surface approach as it is more likely to lead to better quality of learning. Watkins (1984) in a study of Philippine students found that the deep approach to learning is related to achievement grades. In another study of Australian tertiary students, Watkins and Hattie (1985) also found that the depth of the approach the students adopted, though not correlated with achievement grades, showed a strong relationship with the quality of learning outcome. Research findings have also suggested that academically successful

students can be distinguished from less successful ones according to the learning and studying processes that students are able to generate and apply (McKeachie, 1988; Schmneck, 1988; Weinstein & Van Mater Stone, 1992). Weinstein and Van Mater Stone (1992) reported that successful students are better able to utilize learning strategies that are characteristic of the deep approach. Murray-Harvey (1994) using path analysis to investigate student learning in higher education also concluded that the learning process variables are important factors in determining students' learning progress.

Causal Attributions and Self-Concept

There is research support for a significant relationship between causal attributions and self-concept. Weiner (1979) suggested that attribution is causally dominant over self-concept. Marsh et al (1984) contented that there is a consistent relationship between the multidimensional self-concept and multidimensional self-attributions for the causes of academic outcomes. Research findings have also shown that high self-concept is correlated substantially with attribution for success to internal causes such as ability and effort rather than to external factors such as powerful other or luck (Arkin et al, 1980; Fitch, 1970; Marsh, et al, 1984). It was pointed out that accepting personal responsibility for a successful outcome would enhance self-concept while attributing failure to external causes is seen as an attempt to protect self-esteem. Watkins and Gutierrez (1989) in their study of Filipino students found that ability and effort attributions for success did influence self-concept, thus providing cross-cultural support for Weiner's findings.

Causal Attributions and Learning Approaches

Causal attributions are also believed to affect the learning approaches the students adopt. Research findings have suggested that there is a significant relationship between the deeper level of learning and an internal locus of control (Ramanaiah, Ribich and

Schmeck, 1975; Watkins, 1984; Watkins, and Astilla, 1984). It was pointed out that the belief in an individual whether he has control over his own learning is crucial in the adoption of learning approaches. Sherman (1985) stated that a learner who perceives himself as potentially being able to exercise control over learning are more likely to attempt effective learning skills. Watkins (1987) in the investigation of the causal predominance between locus of control and learning approaches found support for the view that personal control is a crucial factor in the adoption of less superficial learning approaches. Salili (1992) using path analysis in her study reported that external attributions are more related to surface approach while internal attributions are more related to deep and achieving approaches.

Inter-relationships among variables

As can be seen from above, research studies have found that the factors of causal attributions, academic self-concept, learning approaches are both inter-related and are likely to affect academic achievement. It is argued that these factors do not operate in isolation but form a complex network that bring about changes in achievement. The focus of this study is to clarify the directions and magnitude of the causal relationships between these variables.

Learning Characteristics of Hong Kong Chinese Tertiary Students

Studies of Hong Kong Chinese tertiary students have been numerous in recent years. Hong Kong tertiary students have been described as keen and competitive (Kember & Gow, 1991). Chinese students are characterized by hard working and having high achievement motivation and they take up more personal responsibility for their learning (Yang, 1986; Salili, 1992). Chinese students have shown to attribute their performance to internal and controllable factors such as effort and study skills. Ability

was considered relatively unimportant as it could be compensated by effort. The Chinese students' emphasis on effort attribution rather then ability is considered more adaptive as it protects the students' self-esteem and reduces the chance of learned helplessness in failure situation (Salili, 1992).

A number of studies have shown that Hong Kong tertiary students out-performed their western counterparts. (e.g. Stevenson and Lee, 1990). However, there have been divided views on how Hong Kong students learn. There have been anecdotal descriptions about Hong Kong students as relying heavily on rote-learning and memorization (e.g. Dunbar, 1988). Yet recent research has questioned such claims. Biggs (1989) found that Hong Kong Chinese students scored higher on the deep and achieving approaches than their English speaking counterparts at Hong Kong international schools. In another study Biggs (1990) also found that the Chinese students scored higher on the deep approach and lower on surface approach to learning than Australian students. Kember and Gow (1991) also found that their research results did not conform with the anecdotal evidence that rote learning is far more widespread among Hong Kong tertiary students than among their counterparts in countries like Australia or the United Kingdom. Hong Kong students have higher scores on the deep approach scales and lower scores on the surface approach scales than Australian students.

Aims of the present study

Research studies have examined academic causal attributions, academic self-concept, learning approaches and their effects on academic achievement respectively. There are as yet few studies in Hong Kong or elsewhere that examine the complexities of the inter-relationships of these variables simultaneously and their effects on achievement. This study aims to investigate the inter-relationships of academic causal attributions, academic self-concept, learning approaches and their effect on academic achievement among Hong Kong Chinese tertiary students. A path model is developed to define the

inter-relationships of these variables and to examine the relative contributions of individual factors to academic achievement. It is hypothesized that academic causal attributions and academic self-concept, both being students' personality factors, influence learning approaches and subsequently influence achievement outcomes.

Method

Samples

The sample of this study was drawn from 162 full-time first year students in the Hong Kong Polytechnic University. The average age of the participants was 20 years and they were enrolled in first year Nursing, Radiography, and Language Communication courses.

Design of the Path Model and Definition of the Variables

In this study, a causal path model analyzing the factors influencing academic achievement was developed. The design of the path model was based on the conceptual presage-process-product model of student learning (see Dunkin and Biddle, 1974; Biggs, 1987a). It was consistent with the theoretical view that individual student factors influence the learning process and subsequently influence academic outcomes. For example, Biggs' 3P Model of Classroom Learning depicts an interactive system of learning in which student characteristics are important presage variables that affect the process variables and eventually influence the product variables. In the proposed path model, locus of control and academic self-concept are variables representing the learner's characteristics in the presage domain. Learning approaches are important process variables which indicate the way the learners go about their studying, and finally

the direction of influence points to academic achievement which is within the product domain. Figure 1 shows the priori model which links up the various variables.

Measurement of Variables

(1) Locus of control

The measurement of locus of control was based on the Revised Causal Dimension Scale developed by McAuley et al in 1992. The Scale provides a free choice of dimensionality in causal attributions. The participants placed their perceived causes of academic success and failure along four different dimensions of causality, i.e. locus of control, stability, personal control and external control. The participants coded the causal attributions along 9-point semantic differential type scales. The advantage of the scale is that the subjects organized the dimensionality of the causes according to their subjective understanding. This method is considered to be superior to the other methods employed in many previous studies as the participants determine the dimensionality of the causes rather than the researchers (Benson, 1989).

(2) Academic Self-Concept

The academic self-concept variable measurement was based on the Personal and Academic Self-Concept Inventory developed by Fleming in 1988. The Inventory comprises 8 sub-scales and the choices were 7-points along the semantic differential scale. Academic self-concept scores were the summing up of the verbal ability and math ability sub-scales. Verbal and math skills are both important general abilities. Despite the fact that research has shown that verbal and math self-concepts are nearly uncorrelated, there still exists a second-order factor (Byrne and Shavelson, 1986) that they represent self-concept of academic ability. Example items were: 'How often do you have trouble expressing your ideas when you try to put them into writing for a class

assignment?' and 'Do you ever think that you have more ability in mathematics than most of your classmates?'

(3) Learning Approaches

For the measurement of learning approaches, the Study Process Questionnaire developed by Biggs (1987) was used. The SPQ has been widely used by researchers overseas and in Hong Kong and is suitable for use among tertiary students. The instrument is a 5-point scale which comprises six sub-scales of which three are the motive and three are strategy sub-scales. The six sub-scales are: surface motive (SM), surface strategy (SS), deep motive (DM), deep strategy (DS), achieving motive (AM) and achieving strategy (AS). The motive and strategy sub-scales were summed up to form the score for each learning approach.

(4) Academic Achievement

Scores of academic achievement was obtained from the end-of-year overall results of the subjects. In this study, the standardized scores were used as the subjects came from three different courses in the university.

Data Analysis

In this study, structural equation modeling techniques were used to test the relationships among locus of control, academic self-concept, learning approaches and academic achievement. The SEM procedures have been illustrated by Kurtz-Costes and Schneider (1994) as having a number of advantages over the traditional regression analyses. Byrne (1984) and Marsh (1990) also pointed out that the use of structural equations modeling procedures is imperative when trying to determine the direction of causality between constructs.

Results

Reliability and Factor Analysis

Causal Attributions

The internal consistency reliability alphas of the four scales of the Causal Dimension Scale were found to be 0.70 (locus of control), 0.77 (personal control), 0.69 (stability), and 0.65 (external control) (See Table 1), within the acceptable range according to Nunnally (1978). They are also comparable to the reliability estimates reported by McAuley (1992) whose studies yielded reliability values ranging from 0.60 to 0.92.

A confirmatory factor analysis was conducted using the Lisrel VIII and the results supported the four-factor model structure as originally proposed by McAuley (1992).

Learning Approaches

The internal consistency reliability estimates of the SPQ are 0.59 (SM), 0.61 (SS), 0.62 (DM), 0.68 (DS), 0.77 (AM), 0.74 (AS). These alpha values are adequate for research purpose and are comparable to those reported by Biggs (1992) for his SPQ tertiary norming sample in Hong Kong. Factor analysis supported a two factor solution with the achieving approach splitting between the surface and deep approaches. This is the same underlying structure found in other studies of SPQ with Hong Kong post-secondary students (e.g. Chan & Watkins, 1995).

Academic Self-Concept

The internal consistency reliability values for the math and verbal scales are 0.90 and 0.61. The alpha for the combined scale of academic self-concept is 0.80 which shows adequate reliability for research purpose.

Table 2 show the means and standard deviations for the variables of locus of control, academic self-concept, surface approach, deep approach and academic achievement. The means scores for locus of causality, academic self-concept, surface approach, deep approach and academic achievement were 36.72, 38.16, 44.37, 45.49, and 63.29 respectively. Their standard deviations were 7.56, 8.58, 7.32, 7.03, and 5.21.

Table 3 shows the zero-order correlations among the variables. It was shown that Locus of Causality was negatively correlated with Surface Aproach and Academic Self-Concept is positively correlated with Deep Approach. Academic Achievement was positively correlated with Locus of Causality whereas it was negatively correlated with Surface Approach.

Structural Equation Modeling

Structural equation modeling procedures were employed to test the relationships among locus of control, academic self-concept, deep and surface learning approaches and academic achievement. Figure 2 shows the final path model. The paths and their coefficients indicate the direction and magnitude of the relationships among the variables. Paths with coefficients not significant at 0.05 level were deleted from the model. The goodness of fit indices showed that the model is of good fit (X^2=24.33, df=21, X^2/df=1.16, NNFI=.98, CFI=.99). The squared multiple correlations for surface approach, deep approach and academic achievement were .29, .21 and .18 respectively.

The final path model has indicated the interrelationships of the various variables under study. The relative contributions of each variable to academic achievement were indicated by the direct, indirect and total effects of the individual factors on academic achievement (See Table 4). As can be seen from the path diagram, causal attributions as represented by locus of control was significantly and negatively related to the surface approach to studying (-0.35) but has no influence on the deep approach. Academic self-concept had positive significant influence on the deep approach to studying (0.39). Both the surface and the deep approaches to studying showed significant direct effect on academic achievement. While the surface approach showed negative effect on achievement (-0.25), the deep approach had positive influence on it (0.31). Locus of control and academic self-concept both did not show direct effect on academic achievement but their influences on achievement were indirect, i.e. via the surface and deep approaches. The indirect effect of causal attributions on achievement was 0.09. Academic self-concept's influence on academic achievement was via the deep approach to studying, with a total indirect effect of 0.12.

Discussion

The results of the study showed that the proposed model had good fit with the data obtained. The model adequately explained the relationship of the variables under study.

In this study, causal attributions are positively correlated with academic achievement. It has causal influence on achievement but the influence was via the surface approach. This finding is consistent with previous research findings which suggested that cognitive attributions are causal factors in tertiary students academic success (Bar-Tal, 1978; Kukla, 1972; Nicholls, 1975). The relationship between causal attributions and achievement is not straightforward. Learning approaches are important mediating variables which act in between. Previous research had found that causal

attributions affect the learning approaches and study skills the students' adopted. In this study, internal locus of control had negative influence on the surface approach to studying. A student who had an internal locus of control and believed that he had control over his own learning was less likely to resort to the superficial learning strategies. He was more likely to try harder and obtained a deeper understanding of the learning materials as he believed that he had personal control over his learning task. Thus an internal locus of control was negatively associated with surface approach to studying which in turn had a negative impact on academic achievement. This finding is consistent with previous research findings of Ramanaiah, Ribich and Schmeck, (1975); Watkins and Astilla, (1984), and Salili, (1992). The results have also confirmed the belief that causal attributions have effect on the learning approaches and study skills the students' adopt and subsequently influence academic achievement.

Similar to causal attributions, academic self-concept influenced learning approaches and then influenced achievement. It was shown that academic self-concept was directly and significantly related to the deep learning approach. This was because when a learner had positive concept of his academic ability, he was more confident in his ability and motivation became intrinsic and satisfaction was derived from a deeper and more meaningful learning approach. Learners with a high academic self-concept were more likely to adopt a deeper learning strategy and deny the superficial approach to studying. This finding was also consistent with that of Watkins & Hattie (1990) which reported that high academic self-concept was related to the deep strategy in the learning process.

The above findings have shown that academic causal attributions and academic self-concept have direct effect on learning approaches to studying and consequently influence achievement outcomes. These findings have important implications for causal attributional retraining and self-concept enhancement interventions. The results of this study lend support to the notion of attributional retraining (Perry & Penner, 1990) and self-concept enhancement. It is suggested that in attributional retraining practices, an

emphasis on the internal and personal attributional beliefs would be more beneficial as internal and personal attributions can enhance intrinsic motivation in learning and an engagement in more meaningful learning strategies. A change to belief in internality will more likely lead to a change to the deep learning approach and subsequently bring out positive changes in achievement outcomes.

Similarly, the findings of the study supported the implementation of self-concept enhancement interventions as a means to improve achievement outcomes. It is only when students who are confident in their academic abilities and view themselves as capable of academic success will they be motivated to work harder and be engaged in deeper level learning. By maintaining a positive academic self-concept, students are likely to adopt the deep approach to studying which in turn brings about better academic outcomes.

Finally, an important aspect to note was the relationship between internal locus of control and academic self-concept in this study. Contrary to other research findings (e.g. Marsh, 1984; Watkins and Gutierrez, 1989; Weiner, 1979), the correlation between the two variables was not significant. An explanation for this may be found in the measurement of the two variables. In the measurement of locus of control, it was measured as the attributional belief in general academic situations whereas the measurement of academic self-concept had focused mainly on the self-concepts of math and verbal abilities. The measurement of academic self-concept was subject-specific whereas for locus of control it was not. It is not groundless for one to speculate that should attributional beliefs be measured with reference to specific subject domain, it may show stronger correlation with the academic self-concept.

Conclusions

The purpose of this study was to examine the inter-relationships among academic causal attributions, academic self-concept, learning approaches and academic

achievement among Hong Kong Chinese tertiary students. A path model of factors influencing academic achievement was developed and tested by using structural equation modeling techniques. Casual attributions as presented by locus of control had direct influence on the surface approach and had indirect effect on academic achievement. Academic self-concept also influenced the deep approach and indirectly influence achievement outcomes. The finding was consistent with the proposed model that student characteristic variables such as causal attributions and self-concept influence learning approaches and subsequently influence academic outcomes. The results of the study also supported Biggs' conceptual model of classroom learning whereby the presage variable, the process variable and the product variable are linked up in a linear manner. However, as the data obtained were cross-sectional, the model could not adequately explain the causal relationships between the variables. In this respect, a longitudinal research design involving at least a two-wave survey with a time interval of at least six months would be desirable in order to establish the causal relationships among the variables.

Figure 1: The priori model of inter-relationships among causal attributions, academic self-concept, learning approaches, and academic achievement

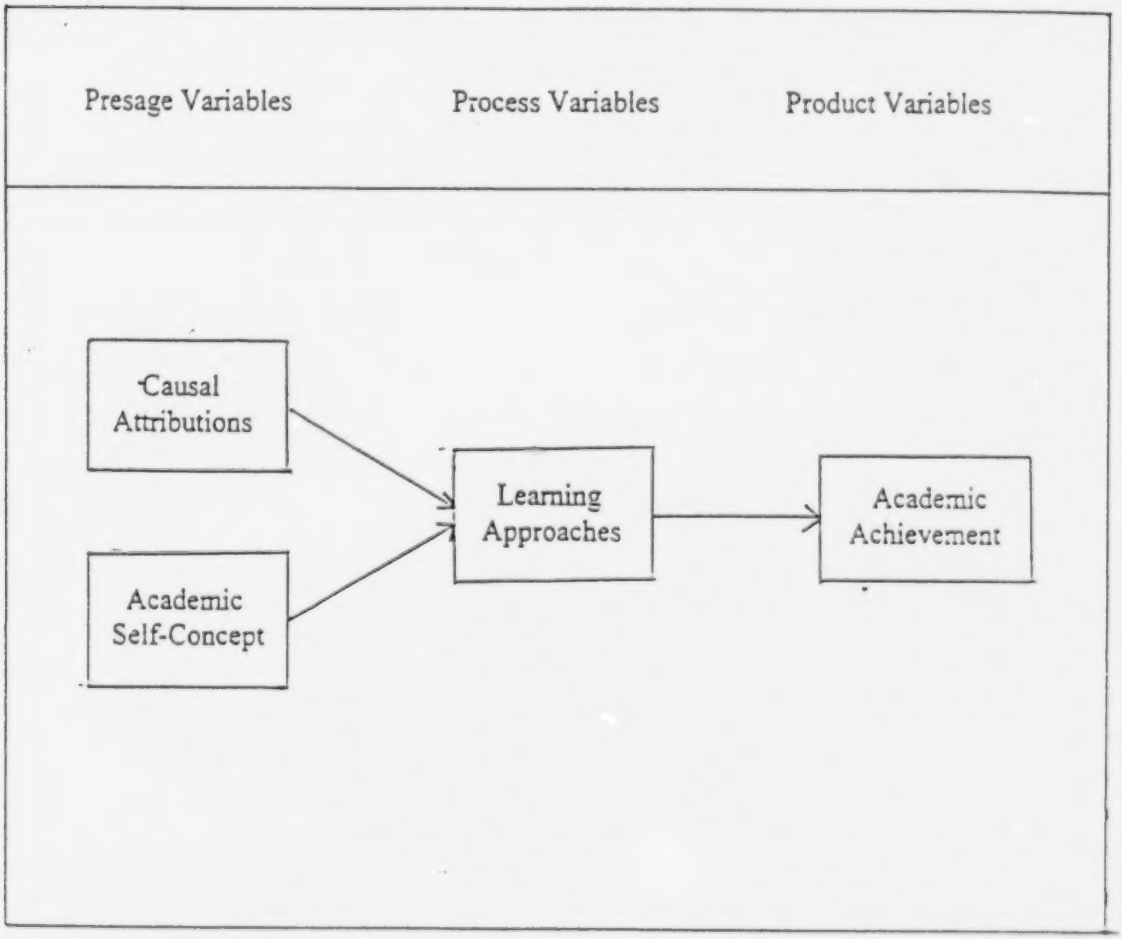

Figure 2: The final path model showing the influences of locus of control, academic self-concept, and learning approaches on academic achievement

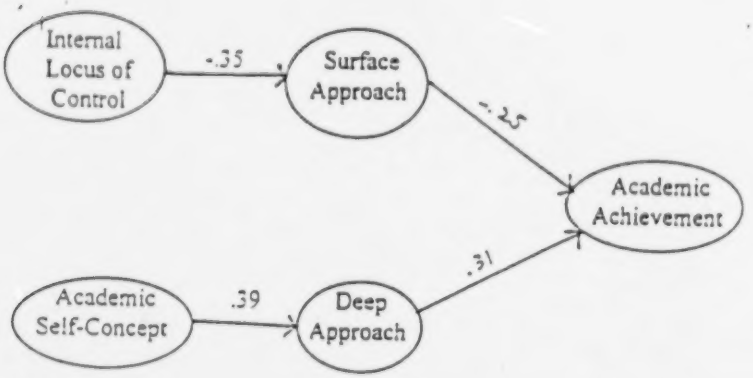

Table 1. Reliability Coefficient Alphas of the Causal attributions, Academic self-concept, and Learning approaches scales

Causal Dimensions	Coefficients Alphas
Internal Locus of Causality	0.70
Personal Control	0.77
Stability	0.69
External Control	0.65
Self-Concept Scales	
Math Scale	0.90
Verbal Scale	0.61
Academic Self-Concept	0.80
Learning Approaches	
SM	0.59
SS	0.61
DM	0.62
DS	0.68
AM	0.77
AS	0.74

Table 2: Means, standard deviations of locus of causality, academic self-concept, surface approach, deep approach, and academic achievement

	Mean	S.D.	N
Locus of causality	36.72	7.56	145
Academic Self-Concept	38.16	8.58	151
Surface Approach	44.37	7.32	144
Deep Approach	45.49	7.03	145
Academic Achievement	63.29	5.21	154

Table 3. The Zero-order Correlations Among the Variables

	Locus of Causality	Academic Self-Concept	Surface Approach	Deep Approach	Academic Achievement
Locus of Causality	1.00	-.07-	-.34**	.00	0.25*
Academic Self-Concept	-.07	1.00	-.13	.25*	0.17
Surface Approach	-.34**	-.13	1.00	.17	-.23*
Deep Approach	.00	.25*	.17	1.00	.15
Academic Achievement	.25*	-.07	-.23*	.20	1.00

*p<0.05 ** p<0.01

Table 4: The direct, indirect, and total effects of locus of causality, academic self-concept and learning approaches on academic achievement

	Academic Achievement		
	Direct Effects	Indirect Effects	Total Effects
Locus of causality	--	.09	.09
Academic self-concept	--	.12	.12
Surface Approach	-.25	--	.25
Deep Approach	.31	--	.31

References

Arkin, R.M., Appleman A.D., & Burger S.M. (1980). Social anxiety, self-presentation, and the self-serving bias in causal attribution, Journal of Personality and Social Psychology, 38, 23-35.

Bar-tal, D. (1978). Attributional analysis of achievement-related behaviour. Review of Educational Research, 48, 259-271.

Basow S.A. & Medcalf, K.L. (1988). Academic achievement and attributions among college students: Effects of gender and sex typing. Sex Roles, Vol.19, Nos.9/10, 555-567.

Benson, M.J. (1989). Attributional measurement techniques: Classification and comparison of approaches for measuring three causal dimensions. The Journal of Social Psychology, 129(3), 307.

Biggs, J.B. (1979). Individual differences in study processes and the quality of learning outcomes. Higher Education, 8, 381-394.

Biggs, J.B. (1987). Student approaches to learning and studying. Melbourne, Australian Council for Educational Research.

Biggs, J.B. (1987a). The Study Process Questionnaire Manual. Melbourne, Australian Council for Educational Research.

Biggs, J.B. (1989). Students' approaches to learning in Anglo-Chinese Schools. Educational Research Journal (Hong Kong), 4, 8-17).

Biggs, J.B. (1990). Effects of language medium of instruction on approaches to learning. Educational Research Journal (Hong Kong), 5, 18-28.

Biggs, J.B. (1992). Why and how do Hong Kong students learn: Education paper 14, Faculty of Education, University of Hong Kong.

Bowen, H.R.(1977). Investment in Learning, San Francisco: Jossey-Bass.

Bridgeman, B. & Shipman, V.C. (1978). Preschool measures of self-esteem and achievement motivation as predictors of third grade achievement. Journal of Educational Psychology, 70, 17-28.

Byrne, B. (1984). The general/academic self-concept nomological network: A review of construct validation research. Review of Educational Research, 54, 427-456.

Byrne, B. (1986). Self-concept/academic self-concept nomological network: A review of construct validity research. Review of Educational Research, 54, 427-456.
Byrne, B.M.& Carlson, J.E. (1982). Self-Concept and academic achievement: A causal modeling approach to construct validation using a multiple-indicator structural equation model. Paper presented at the Annual Meeting of the American Educational Research Association, New York.
Byrne, B.M. & Shavelson, R.J. (1986). On the structure of adolescent self-concept. Journal of Educational Psychology, 78, 474-481.

Byrne, B. M. & Shavelson, R. J. (1986). On gender differences in the structure of adolescent self-concept. Paper presented at the Annual Meeting of the American Educational Research Association, San Francisco.

Chapman, J. W., Cullen J.L., Boersma, F.J. & Maguire, T.O. (1981). Affective variables and school achievement: A study of possible causal influences. Canadian Journal of Behavioural Science, 13, 181-192.

Chan, Y.K. & Watkins, D. (1995). How do Hong Kong hospital-based student nurses learn? Education Research Journal, Vol.10, No.1, 54-59.

Chen J.S. & Toffefson, N. (1989). College Students, Causal Attributions for their Achievement. College Student Journal, 23(2), 169-177.

Covington, M.V. & Omelich, C.L. (1984). An empirical examination of Weiner's critique of attribution research. Journal of Educational Psychology, 76, 1214-1225.

Dunbar, R. (1988). Culture-based learning problems of Asian students: some implications for Australian distance educators, ASPESA Papers, 5, 10-21.

Elig, T. & Frieze, I. H. (1975). A multi-dimensional scheme for coding and interpreting perceived causality for success and failure events: The coding scheme of perceived causality (CSPC). JSAS Catalog of Selected Documents in Psychology, 5, 313.

Entwistle, N. J. & Entwistle, A. (1991). Contrasting forms of understanding for degree examinations: the student experience and its implications. Higher Education, 22, 205-227.

Entwistle, J., Hanley, M., & Ratcliffe, G. (1979). Approaches to Learning and Levels of Understanding, British Educational Research Journal, Vol.5, No.1, 99-114.

Findley, M.J. & Cooper, H.M. (1983). Locus of Control and Academic Achievement: A Literature Review. Journal of Personality and Social Psychology, Vol.44, No.2, 419-427.

Fitch, G. (1970). Effects of self-esteem, perceived performance, and choice on causal attributions. Journal of Personality and Social Psychology, 16, 311-315.

Hansford, B.C. & Hattie, J.A. (1982). The relationship between self and achievement/performance measures. Review of Educational Research, 52, 123-142.

Hattie, J. (1992). Self-Concept, L. Earlbaum Associates.

Hau, K.T. & Salili, F. (1990). Examination result attribution, expectancy and achievement goals among Chinese students in Hong Kong. Educational Studies, 16(1), 17-31.

Helmke, A. & Aken, M.A.G. (1995). The Causal Ordering of Academic Achievement and Self-Concept of Ability During Elementary School: A Longitudinal Study. Journal of Educational Psychology, Vol.87, No.4, 624-637.

Horn, C., Bruning, R., Schraw, G., & Curry, E. (1993). Paths to Success in the College Classroom, Contemporary Educational Psychology, 18, 464-478.

Keeves, J.P. (1986). Aspiration, Motivation and achievement: Different Methods of Analysis and Different Results. International Journal of Educational Research, 10, pp.115-243.

Kember, D. & Gow, L. (1991). A challenge to the anecdotal stereotype of the Asian student. Studies in Higher Education, Vol. 16, No. 2, 117-128.

Kukla, A. (1972). Attributional determinants of achievement-related behaviour. Journal of Personality and Social Psychology, 21, 166-174.

Kurtz-Costes, B.E. & Schneider, W. (1994). Self-Concept, Attributional Beliefs, and School Achievement: A Longitudinal Analysis, Contemporary Educational Psychology, 19, 199-216.

Marsh, H.W. (1984). Relations among dimensions of self-attribution, dimensions of self-concept, and academic achievements. Journal of Educational Psychology, 76, 1291-1308.

Marsh, H.W. (1987). The big-fish-little-pond effect on academic self-concept. Journal of Educational Psychology, 79, 280-295.

Marsh, H.W. (1990). Causal ordering of academic self-concept and academic achievement: A Multiwave, Longitudinal Panel Analysis. Journal of Educational Psychology, Vol, 82. No.4. 646-656.

Marton, F. & Saljo, R. (1976). On qualitative difference in learning: outcome and process. British Journal of Eductional psychology, Vo. 46, 4-11.

McCombs B.L. (1988), Motivational Skills Training: Combining Metacognitive, Cognitive, and Affective Learning Strategies, in C.E. Weinstein, E.T. Goetz and P.A. Alexander (eds.), Learning and Study Strategies: Issues in Assessment, Instruction, and Evaluation, San Diego, Academic Press.

McAuley, E. & Duncan, T.E. (1992). Measuring causal attributions: The Revised Causal dimension Scale (CDSII). Personality and Social Psychology, Vol.18, No.5. 566-573.
McKeachie, W.J. (1988). The need for study strategy training. In: C.E. Weinstein, E.T. Goetz & P.A. Alexander (Eds.). Learning and study strategies: Issues in assessment, instruction, and evaluation. San Diego, California: Academic Press.

Minnaert, A., & Janssen, P.J (1992). Success and progress in higher education: A structural model of studying. British Journal of Educational Psychology, 62, 184-192.

Murray-Harvey, R. (1993). Identifying Characteristics of Successful Tertiary Students Using Path Analysis. Australian Educational Researcher, Vol.20, No.3 1993.

Murray-Harvey, R. (1994). A Causal Path Analysis of Factors Influencing Academic Achievement. Academic Achievement (in press).

Murray-Harvey, R. and Keeves, J.P. (1994). Students' Learning Processes and Progress in Higher Education, Paper prepared at the American Educational Research Association 1994 Annual Meeting, April, 4-8, New Orleans.

Newman, R.S. (1984). Children's achievement and self-evaluations in mathematics: A longitudinal study. Journal of Educational Psychology 76, 857-873.

Nicholls, J.G. (1975). Causal attributions and other achievement-related cognitions: Effects of task outcome, attainment value, and sex. Journal of Personality and Social Psychology, 31, 379-316.

Nunnally, J.C. (1978). Psychometric theory, 2nd ed. New York: MaGraw-Hill.

Perry, R. P., Hechter, F.J., Menec, V.H. & Weinberg, L.E. (1993). Enhancing Achievement Motivation and Performance in College Students: An Attributional Retraining Perspective. Research in Higher Education, 34, 687-723.

Perry, R.P. & Penner, K S. (1990). Enhancing Academic Achievement in College Students Through Attributional Retraining and Instruction. Journal of Educational Psychology, 82, pp.262-271.

Peterson C. & Barrett, L.C. (1987). Explanatory style and academic performance among university freshmen. Journal of Personality and Social Psychology, Vol.53, No.3, 603-607.

Power, C., Robertson, F., & Baker, M (1987). Success in higher education. Commonwealth Tertiary Education Commission Report, Australian Government Publishing Service.

Powers, S., Choroszy M., & Douglas P. (1987). Attributions for success and failure of Japanese-American and Anglo-American University Students. Psychology, A Quarterly Journal of Human Behaviour, Vol. 24, Number 3, 1987.
Ramanaiah, N.V., Ribich, F.D, & Schmeck, R.R (1975). Internal/external control of reinforcement as a determinant of study habits and academic attitudes, Journal of Research in Personality, 9: 375-384.

Revicki, D.A. (1982). The relationship between self-concept and achievement: An investigation of reciprocal effects. Paper presented at the Annual Meeting of the American Educational Research Association, New York.

Rotter, J. B. (1966). Generalized expectancies for internal locus of control of reinforcement. Psychological Monographs, 80(1, Whole No. 60).

Salili, F. (in press). Accepting personal responsibility for learning. In Watkins, D. and Biggs, J. (Eds.), The Chinese Learner:Research and Practice.

Salili, F (1994). Age, sex, and cultural differences in the meaning and dimensions of achievement. Personality and Social Psychology Bulletin, 20, 635-648.

Scheirer, M.A. & Kraut, R.E. (1979). Increasing educational achievement via self-concept change. Review of Educational Research, 49, 131-150.

Schmneck, R.R. (1988). An introduction to strategies and styles of learning. In: R.R. Schmeck (Ed.), Learning strategies and learning styles, New York: Plenum Press.

Shavelson, R.J., Hubner, J.J., & Stanton, G.C. (1976). Self-concept: validation of construct interpretations. Review of Educational Research, 46, 407-441.

Shavelson, R. J. & Bolus, R. (1982), Self-concept: The interplay of theory and methods., Journal of Educational Psychology, Vol. 74, No.1, 3-17.

Sherman, T.M. (1985). Learning improvement programs, A review of controllable influences. Journal of Higher Education, Vol. 56, No.1.

Sinclaire, K.E. (1991). Students' Affective Characteristics and Classroom Behaviour, in Marjoribanks, K. (Ed.) The Foundations of Students' Learning. Pergamon Press.

Skaalvik , E.M. & Hagtvet, K.A (1990). Academic achievement and self-concept: An analysis of causal predominance in a developmental perspective. Journal of Personality and Social Psychology, 58, 292-307.

Song, I.S. & Hattie, J. (1984). Home environment, self-concept and academic achievement: A causal modeling approach. Journal of Educational Psychology, 76, 1269-1281.

Stevenson, H.W. & Lee, S. (1990). Context of achievement. Monographs of the Society for Child Development, Serial No. 221, Vol.55, Nos. 1-2.
Sweeney, P.D., Moreland, R.L., & Gruber,K.L. (1982). Gender Differences in Performance Attributions: Students' Explanations for Personal Success or Failure. Sex Roles, Vol.8, No.4, 1982.

Trigwell, K. & Prosser, M (1991). Relating approaches to study and quality of learning outcomes at the course level. British Journal of Educational Psychology, 61, 265-275.

Watkins, D (1984). Student learning processes: an exploratory study in the Philippines. Human Learning 3: 33-42.

Watkins, D. (1986). Learning processes and background characteristics as predictors of tertiary grades. Educational and Psychological Measurement, 46, 199-203.

Watkins, D. (1987). Academic locus of control: a relevant variable at tertiary level? Higher Education, 16, 221-229.

Watkins, D. (1989). Causal Relationships Among Self-Concept, Attributions, and Achievement in Filipino Students. Journal of Social Psychology, 130 (5), 625-631.

Watkins, D. & Astilla, E. (1984). The dimensionality, antecedents and study method correlates of the causal attribution of Filipino children. Journal of Social Psychology, 124: 191-199.

Watkins, D. & Astilla, E. (1986). Causal Dominance Among Self-Concept, Locus of Causality, and Academic Ahievement. The Journal of Psychology, 120(6), 627-633.

Watkins, D., & Dong, Q. (1994). Assessing the self-esteem of Chinese school children. Educational Psychology, 14(1), 129-137.

Watkins, D. & Gutierrez, M. (1989). Between-and-Within Construct Aspects of Academic Self-Attributions: an investigation of the construct validity of an Australian instrument for Filipino subjects. Australian Journal of Psychology, 41(3), 291-301.

Watkins, D. & Hattie, J. (1985). A Longitudinal Study of the Approaches to Learning of Australian Tertiary Students. Human Learning, Vol. 4, 127-141.

Watkins, D. & Hattie, J. (1990). Individual and Contextual Differences in the Approaches to Learning of Australian Secondary School Students. Eductional Psychology, Vol.10, No.4.

BEST COPY AVAILABLE

Weiner, B. (1979). A theory of motivation for some classroom experiences. Journal of Educational Psychology, 71: 3-25.

Weiner, B. (1980). Human motivation. New York: Holt, Rinehart & Winston.

Weiner, B. (1983). Some methodological pitfalls in attributional research. Journal of Educational Psychology, 75, 530-543.

Weiner, B. (1985). An attributional theory of achievement motivation and emotion. Psychological Review, 92, 548-573.

Weiner, B. (1986). An Attribution Theory of Motivation and Emotion. New York: Springer-Verlag.

Weiner, B., Frieze, I.H., Kukla, A., Reed, L., Rest, S., & Rosenbaum, R.M. (1971). Perceiving the causes of success and failure. Morristown, NJ: General Learning Press.

Weinstein, C.E. & Van Mater Stone, G. (1992). "Broadening Our Conception of General Education: The Self-Regulated Learner", in N. Raisman (ed.). Directing General Education Outcomes, San Francisco, Jossey-Bass.

Wolfle , L.M. & Robertshaw, D. (1982). Effects of college attendance on locus of control, Journal of Personality and Social Psychology, 43: 802-810.

Wylie, R.C. (1979). The self-concept. Lincoln: University of Nebraska Press.

Yang, K.S. (1986). Chinese personalilty and its change. in M.H. Bond (Ed.) the Psychology of the Chinese People. Oxford University Press.

BEST COPY AVAILABLE